Recitation **10.213** **03/04/02**
Spring 2002 YT

Entropy Calculation

$\Delta S = \int \frac{\delta Q_{rev}}{T}$ Statement of 2nd law: $\Delta S_{sys} + \Delta S_{surrounding} \geq 0$

Calculating ΔS_{sys}:
If process is reversible → ____

If process is irreversible → ____

But in any case, since ΔS is a state function: $\Delta S =$

If "surrounding" is at constant temperature (a heat reservoir), then $\Delta S_{surrounding}$ is calculated as:

$\Delta S_{surrounding} =$

(see page 165 of textbook).

Maxwell's Equations
= math. manipulation to allow us to get U, H, G, S, A in terms of P, V, T, and Cp.

EOS gives us f(P,V,T) = 0 and Cp = f(T) → we need only 2 variables to figure out the rest.

Main use: Getting rid of $\left(\frac{\partial S}{\partial \ldots}\right)_{\ldots}$ and $\left(\frac{\partial \ldots}{\partial S}\right)_{\ldots}$

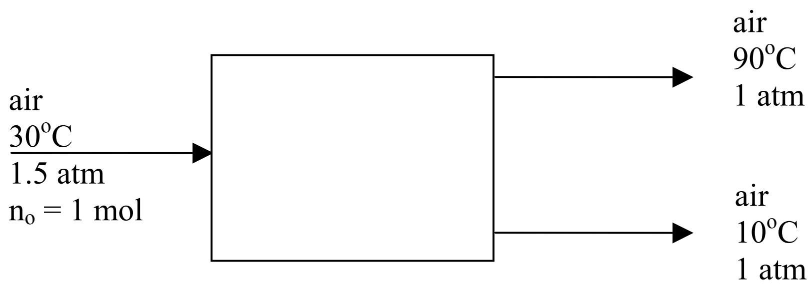
Example Problem:
Gas A goes from state 1 (T_1, V_1) to (T_2, V_2). Give the expression for the change in enthalpy H.

The Use of 2nd Law

2nd Law is often used to answer questions of this nature:

1) Is this possible?
2) What is the (maximum/minimum) (heat / work) possible?

Example Problem:



There is no net heat or work interaction with the surrounding.
Assume air is an ideal gas with Cp = 3.5R (constant). Is the process drawn above feasible?

To think about: If we were to change the pressure of the air coming in (keeping everything else the same), what is the lowest pressure possible?